

**Cruise Report for
the 1997 Minerals
Management Service
Field Survey**

Sediment Quality in
Depositional Areas of
the Shelikof Strait and
Outermost Cook Inlet

**Prepared for
Minerals Management Service**

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1.0 Introduction

As part of the Minerals Management Service (MMS) program entitled “Sediment Quality in Depositional Areas of Shelikof Strait and Outermost Cook Inlet,” the first segment of a two-year field program was conducted from July 7 to 17, 1997. The scientific crew, on board the Research Vessel (R/V) *Alpha Helix*, collected samples for biological, chemical, and toxicological analyses from the program study area. This cruise report summarizes the activities and samples collected during the 1997 field survey.

During the 1997 Shelikof Strait and Outermost Cook Inlet field sampling survey, the following components were successfully completed:

- Fourteen fixed stations and forty-five random stations in Shelikof Strait and Outermost Cook Inlet were occupied and sampled. In addition, fish were collected from three stations and one source station was sampled.
- Surface sediment, sediment cores, sediment profile images, fish samples, and conductivity, temperature and depth (CTD) data were collected from specified stations.
- Field samples were delivered to analytical laboratories for appropriate analyses.

2.0 Schedule

The 1997 cruise was conducted from July 7 to 17, 1997, and coincided with the most favorable tidal and current conditions in the program study area. The field team arrived in Seward, Alaska on July 6. Mobilization of the field team and the R/V *Alpha Helix* took place on July 7, and the R/V *Alpha Helix* departed Seward on July 8, 1997. Sediment and fish sampling was conducted from July 9 through July 16. The *Alpha Helix* returned to Seward on July 17 for demobilization at the Seward Marine Center (one day ahead of schedule). Field sampling personnel from Arthur D. Little, Inc. (ADL), Florida Institute of Technology (FIT), Applied Marine Sciences (AMS), EVS Environment Consultants (EVS), and MMS participated in the survey. The scientific team and ship's crew conducted the work on a 24 hour-a-day shift schedule.

3.0 Cruise Track and Samples Collected

The cruise track began with a transit to the outermost sampling area, Zone 3 of the Shelikof Strait (Attachment 1: cruise track chart of the study area). Attempts were made to sample two fixed stations in each of Zones 1 and 2 (sampling gear shake-down) during the first day of transit, however, only one attempt was successful. Zone 3 was reached on July 10, 1997, and sampling was initiated. As the sampling in Zone 3 was completed, the cruise progressed through Zone 2 to Zone 1 and then to Zone 0 (Outermost Cook Inlet). A complete list of the random and fixed sampling stations that were occupied and

sampled for all zones of the study area is included in Table 1. Table 1 also provides the station ID, station type, latitude and longitude, depth, date and time of sampling, and the type of chemical, biological, toxicological, and geophysical analyses for each sample. Attachment 1, the cruise track chart, shows the 1997 cruise track and the locations of fixed, random, and alternate sampling stations.

Source sediment samples were collected from the Homer boat harbor during the 1997 R/V *Alpha Helix* cruise. In addition, source samples (sediments) were collected from the Copper and Susitna Rivers after the R/V *Alpha Helix* cruise.

The R/V *Alpha Helix* Ship Bridge Logs, which provide detail of all activities during the 1997 cruise, are included in Appendix A. Each log includes entries with date and time, ship's position and course, oceanographic station data (e.g., station name, wind speeds, weather), and remarks, as recorded by the ship's master.

4.0 Sampling Procedures

Standard sampling procedures were followed at each sampling station according to the Field Logistics and Sampling Plan for the 1997 Minerals Management Service Field Survey (ADL, 1997). Typical sampling procedures included: collection of CTD measurements with Seabird CTD; surface sediment grab sample collection using a modified Van-Veen Grab; sediment cores using MK III boxcore (at specified fixed and random stations); and Sediment Profile Imaging (SPI) using the underwater camera. At four stations long-line gear was deployed for the collection of fish samples, and successful fish collections were made at three of the stations. Fish dissections were conducted on-board the vessel to subsample liver, gill, and kidney tissues for Cytochrome P-450 and chemistry analyses (liver only). Sediment cores were subsampled on-board the vessel for subsequent geochronology and chemistry analyses.

Photodocumentation, station logs, field notes, and shift forms were recorded during the field survey. The station logs for each sampling station are included in Appendix B. Each station log includes a description of the sampling location, observations, samples collected, and comments.

5.0 Technical Issues

At the beginning of the 1997 field survey, the depth required for the CTD measurements needed to be defined due to the extended wire time involved for deployments at deep stations in Zones 2 and 3. A maximum CTD depth of 200 meters was determined to be acceptable at deep stations. As a result, CTD measurements were collected to a depth of 200 meters (or bottom, whichever was shallower) during the 1997 R/V *Alpha Helix* cruise.

The selection criteria for alternate stations was defined so that the next closest alternate station was selected if sampling at any random or fixed station was unsuccessful. Several alternate stations were sampled during the course of the survey due to inappropriate bottom substrate. The alternate stations sampled are identified in Table 1, which also includes the rationale for requiring an alternate station selection.

Halibut were selected as the primary target species for fish samples based on the results of the long-line catches. However, a limited number of sablefish and arrowtooth flounder were collected in addition to halibut (Table 1).

The grab sampler required some modifications (a shock cord dampener and extra wooden “feet”) to successfully collect samples at deep stations in the heavy seas encountered during the survey. In addition, the order of gear deployment was modified at some stations due to limitations in the crane wire length (e.g., the grab sampler and CTD were deployed consecutively from the hydrowire winch at many stations). Two gravity cores were also collected (Table 1) in order to obtain “deep” sediment profiles. The gravity cores were archived frozen for possible future analysis.

6.0 References

Arthur D. Little, Inc., *Field Logistics and Sampling Plan for the 1997 Minerals Management Service Field Survey, Sediment Quality in Depositional Areas of the Shelikof Strait and Outermost Cook Inlet*, Prepared for Minerals Management Service, July 3, 1997.

Attachment 1: 1997 R/V *Alpha Helix* Cruise Track Chart

Appendix A

R/V *Alpha Helix* Ship Bridge Logs

Appendix B

Station Logs